

The Vision of Heavenly Harmony The work of John Martineau, 1996-2006

Nicholas Kollerstrom

Do Harmony and Proportion exist in the heavens? In 1995, *A Book of Coincidence* was published by John Martineau. As a study of heavenly harmonies, its appeal was visual rather than intellectual or mathematical. As John Michell wrote in his foreword,

‘The remarkable fact proved in this book is that the bodies of the solar system and their orbits are related to each other more or less precisely by a series of basic geometric figures. To perceive this fact one does not have to be a mathematician; it is clearly illustrated in John Martineau’s diagrams. Anyone can understand these, and the harmonies which they demonstrate among the planets are undeniably real.’

His discovery of these harmonies came about through a two-year Masters degree at the Prince of Wales’ School of Architecture in 1994, tutored by the renowned Islamic-Platonic architect and geometer Keith Critchlow. The images all used circles. It had some 70 constructions, geometric figures linking ideal circles of the planetary orbits, to some of which he gave a finite thickness to represent their nearest and furthest approaches to the Sun. We here focus primarily upon his Venus-Earth diagrams.

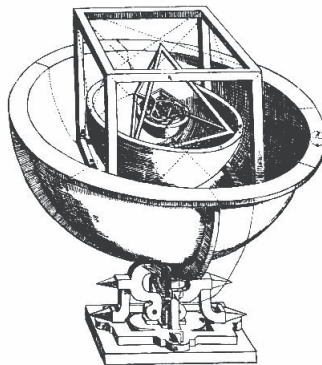


Figure 1: Kepler 1596 diagram

His constructions were a modern development of what Kepler had earlier attempted, but they reached some three orders of magnitude higher exactitude. Four centuries earlier, in 1596, Kepler's first work *Mysterium Cosmographicum* had appeared, arguing that the five regular, Platonic solids fitted into the intervals between orbit paths of the six known planets. Kepler's design had the planetary paths as spheres of a certain thickness, as the planets moved between their aphelia and perihelia, closest and furthest from the Sun, and the Platonic solids just touched them on the outside and inside. Experts have argued that, if the lunar orbit is included in the 'width' of the earth's sphere, then Kepler's shapes fit within a few percent (Field, 1982). The orbits of Mars and Earth were spaced using a dodecahedron, while an icosahedron fitted between the paths of Earth and Venus (Kepler, 1999, p. 13; 1997, p. 497). Martineau's book opened with the image of Kepler's design here shown.

In his later *Harmonices Mundi* of 1618, Kepler wrote concerning his theory of planetary harmonies, that Earth and Venus had just the one harmony of 5:8, which was he said a 'minor sixth' (Kepler, 1997, p. 462). Venus weaves a pentagram in the sky, connecting the celestial longitudes of its solar conjunctions every eight years, as it moves through its five synodic cycles. Elements of the Fibonacci sequence can here be discerned, with 13 Venus-years every 8 Earth-years (to 99.97 %) and 5 synodic cycles of Venus chiming in this period (to 99.92 %)¹. These proportions approximate to phi (Φ) the golden ratio, 1.618... It may help to bear these numbers in mind.

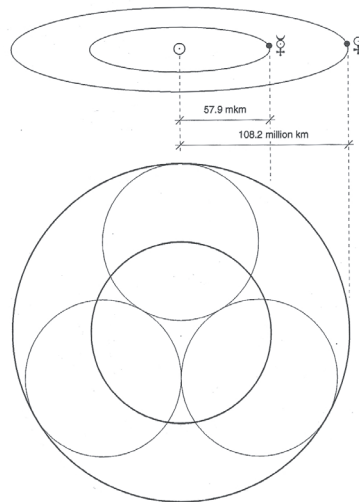


Figure 2: Venus and Mercury

1 Venus' synodic period and year are 583.92 and 224.72 days respectively.

Venus and Mercury

Three equal circles touch, then a circle placed around them and another circle through their centres will space the mean orbits of Venus and² Mercury to 99.8%.³ This was the first of his symmetries – or, circular-mandala patterns – which Martineau discovered, back in 1992. Does it ‘mean’ anything, one may ask? No god of Meaning is going to turn up and answer that one for us.

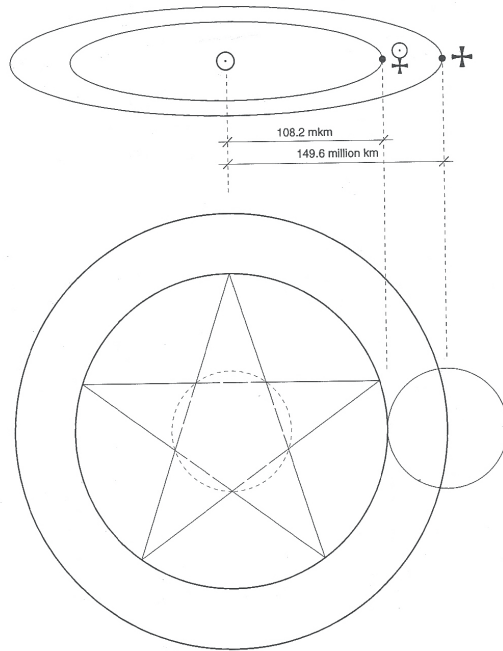


Figure 3: Venus-Earth pentagram

2 For the ‘mean’ orbits, Martineau used the elliptical semi-major axes. As Ian Ridpath explained to me, ‘The semimajor axis is indeed the mean distance of an orbiting object from its primary. If you look at the figures, it’s the average of the perihelion and aphelion distances.’ This is the general convention, see eg ‘Norton’s 2000 Star Atlas and Reference Handbook’ ed. Ian Ridpath. Wikipedia’s ‘List of gravitationally rounded objects of the Solar System’ conveniently gives these mean radii. Hartmut Warm, in his *Signature of the Celestial Spheres* explained that the semi-major axis of an elliptical orbit is a true mean value, provided that it is integrated over space not time, i.e taking a mean over the 360 degrees of rotation, not the periodic time of orbit: p. 333.

3 For mean orbit radii see NASA’s online ‘Fact Sheet’ for each planet.

Earth and Venus

Martineau made a pentagram Earth-Venus-construction which fitted to 99.9%, describing it as follows: 'A circle is drawn which represents Venus' mean orbit. A pentagram is constructed inside it and a small circle placed through the arm-crossing points. The radius of this small circle divides the radius of the larger into the [square of the] golden section and can be used to space Venus' orbit to earth's orbit...' (Martineau, 1995, p. 22)

The sides of a regular pentagram all form golden-ratio proportions to each other. If such a pentagram is placed inside a circle and a smaller circle drawn passing through its intersections, then the two radii will be in *the square of the golden ratio* to each other. In other words, taking the mean radius of Venus' orbit, and dividing by the difference between that of Earth and Venus, gives phi-squared – to within 99.9%.⁴

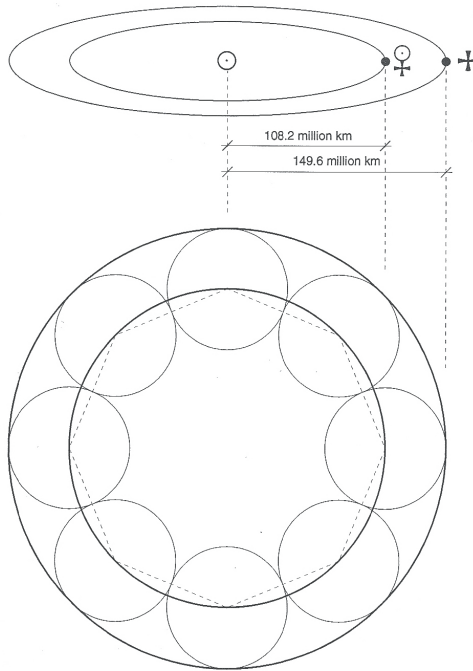


Figure 4: Venus-Earth octagon

4 If 'Ve' and 'Ea' are the mean Venus and Earth radii respectively (0.72333 and 1.000 AU), then this geometrical construction may be expressed as $Ve/(Ea-Ve) = \Phi^2$ (N.B., $\Phi^2 = 2.681\dots$), or more conveniently as $Ea : Ve = 3 - \Phi$ to 99.9 %

Traditionally the eight-pointed star was the symbol of Venus-deities (*Benard & Moon*, 2000: p. 26 Aphrodite, p. 69 Inanna). mirroring the eight-year Venus cycle, and Martineau has a beautiful image reminding us of this. It was entitled ‘Venus’ Eight Halos’ and he explained: ‘If eight touching circles are drawn from Venus’ mean orbit then the circumcircle enclosing these eight circles defines Earth’s mean orbit with over 99.9% accuracy.’ Here the equation is

$$Ea : Ve = 1 + \sin (\pi/8)$$

I wrote and advised him that this synchrony reached one entire order of magnitude higher precision, than he had claimed for it, verily 99.99% or one part in ten thousand. In a later book he accepted this.⁵

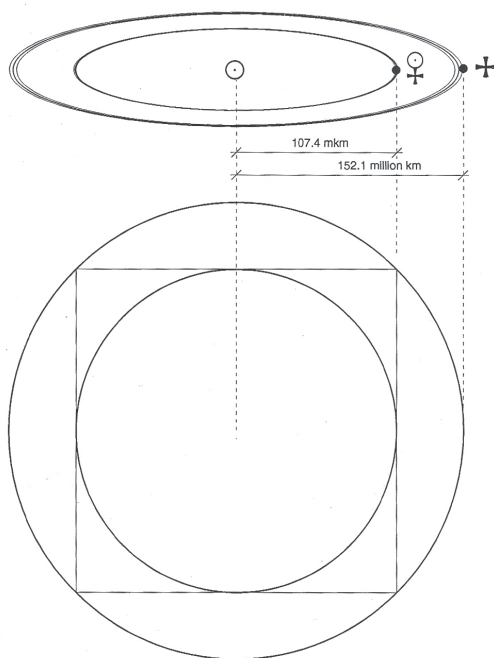


Figure 5: Venus-Earth Square

The above symmetries took the *mean* radii of Earth and Venus, reasonable considering that they both have only a small eccentricity. His next construction compared two limits, from the *minimal* radius of Venus’ orbit around

⁵ His later *A Little Book of Coincidence* cites this higher level of accuracy, p. 28.

the Sun at its perihelion to the *maximal* radius of Earth's orbit (its aphelion). He explained: 'Earth and Venus are so very happy together that it is their whole combined space which exhibits the simplest harmony. Between Earth's greatest distance from the Sun and Venus' closest approach to the Sun lies the total realm of Earth & Venus, their *home*. A single square proportions this region with 99.9% accuracy. The square was generally associated with Earth, the City or the Home...'⁶

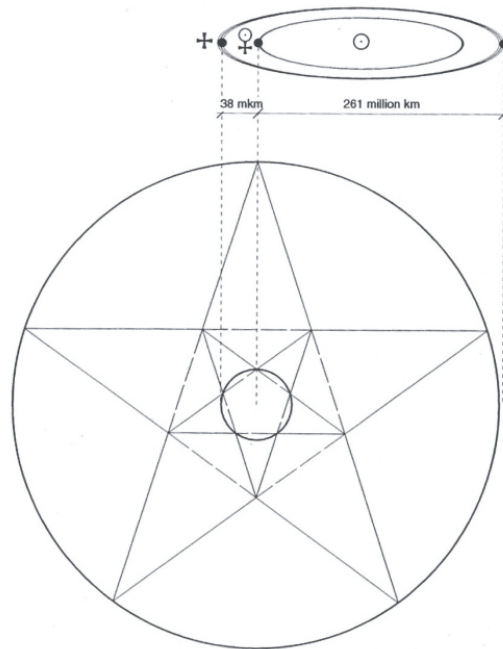


Figure 6: Venus-Earth double pentagram

His fourth Earth-Venus symmetry was problematic. It used the notion of limits between aphelion and perihelion positions, as before (and thereby invited comparison with Kepler's early use of planetary spheres of finite thickness). A pentagram inscribed inside another pentagram generates two circles as shown whose radii will be in the fourth power of the golden ratio

⁶ Here the equation is: $Ea_{\max} : Ve_{\min} = \sqrt{2}$ to 99.9%, where Ea_{\max} is Earth's maximum orbit-radius (reached at aphelion, near to July 5th each year) and Ve_{\min} is Venus' minimum radius, at its perihelion position.

(viz. 6.854...) He explained, 'Both planets have near-circular orbits and Venus closes the space between her and us from a maximum of 261 million km to a minimum of 38 million km...' *But*, for such a very close approach to work it would require the two apse lines to be aligned, as they may theoretically do in the *very* distant future, by which time the eccentricities will have changed; but as far as human experience is concerned, Venus will not ever draw nearer than about 38.9 million km and so the ratio in question will not go higher than about 6.6. He had envisaged this one (he told me) as working between Keplerian 'spheres'.

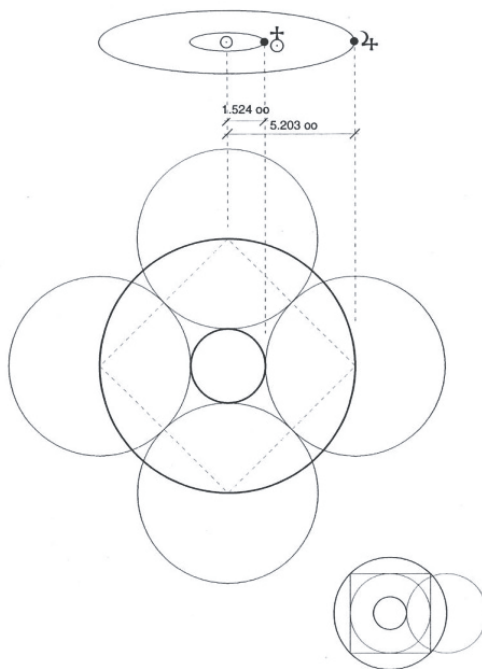


Figure 7: Mars and Jupiter square

Mars-Jupiter

As an indication of how the *Book of Coincidence* treated other planetary radii, he had a construction called 'The Crusade', this being 'a way of spacing Mars and Jupiter': 'A circle is drawn to represent Jupiter's orbit. Four touching circles drawn with centers on this circle leave a space in the middle which can be taken to represent Mars' mean orbit with over 99.9%

accuracy.²⁷ As with the second construction, I was startled to ascertain that this design reached one order of accuracy *higher* than its author had claimed in 1996 – truly 99.99% or one part in ten thousand.⁸

Earth and her Moon

As to where Martineau got the idea from, of seeking for precision harmonies in the heavens, we should credit the British philosopher John Michell, for his Earth-Moon ‘squaring of the circle’, published in 1971. With a circle drawn concentric to a square and having the same circumference. Earth is inside the square, just touching it. The Moon is brought in to just touch the earth, and then that circle will pass through the Moon’s center, to 99.7%.⁹ Earth and her Moon square the circle. Selene’s Sphere is just the right size.¹⁰

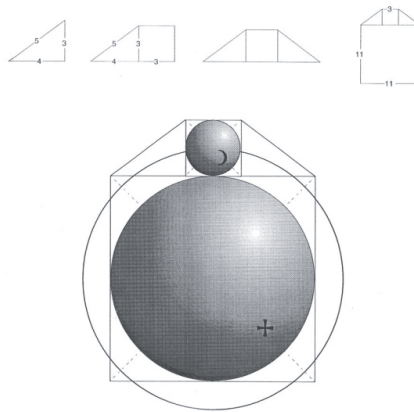


Figure 8: Earth and her moon

⁷ Here the equation is, $Ma : Ju = (1 - 1/\sqrt{2})$ to 99.99%, where Ma and Ju are the mean planetary orbit-radii.

8 Ma = 1.52366, ju = 5.20336 AU; his later *A little book of Coincidence* more or less accepted this, claiming 99.98% for this construct, p.40.

9 Taking the IAU-defined mean lunar radius as 0.2725 that of Earth, the equation is, $R_M + R_E : R_E = 4/\pi$, where R_M is the mean lunar diameter and R_E is that of Earth: <http://umbra.nascom.nasa.gov/eclipse/990811/text/mean-lunar-radius.html>

10 For a more exact construction using ϕ rather than π , see Zürcher 2009; here the equation is, $R_M + R_E : R_E = \sqrt{\Phi} - 0.9997$, i.e. within three parts in ten thousand.

Martineau followed John Michell's example, in using a pi-value of $22/7$ for this calculation, which is so to speak embodied on the geometry shown in his diagram, where Earth and Luna are thereby given an 11:3 size ratio.

The charm of Martineau's book lay in the way it offered no explanations, nor calculations (I have included a few here), it was purely geometrical. Hence its images could work in a direct visual manner, in what one might call a right-cerebral hemisphere manner, upon readers. An astronomy book without theory? Let's listen to what he wrote in a prologue:

‘In our age, when motorways are built through holy hills and where the sacred science of geometry is all but lost, it is to be hoped that the diagrams in this book encourage those who study them to remember something of that aspiration which in former centuries seems to have been more commonplace... For this reason I have sought at all times to keep my words to a minimum and let the geometrical speculations speak for themselves, so that they may spark some idea in the heart of the reader...’

I never saw a book that had more effect upon people. This was in part due to the strange condition whereby he adamantly refused to reprint, so that the initial one-thousand print run was all there ever were! Instead he turned to producing his little ‘Wooden books’ of a great simplicity, which have sold all over the world and been translated into many different languages.¹¹ But, those were far from being the same as his divine masterpiece.

My contribution has been that of expressing the geometrical pattern or harmonies discovered by Martineau in simple formulae, which have here been included, and also in calibrating their accuracy. It was the discovery that certain of his symmetries had a higher order of magnitude precision than he claimed for them, which pulled me into this subject.

Does Nature aspire towards perfection? The Creator, Kepler optimistically affirmed, had ‘introduced nothing into Nature without thoroughly foreseeing not only its necessity but its beauty and power to delight.’ (*Kepler*, 1997, p.55) This helped him to believe that the five regular solids spaced out the six planetary orbits. Some modern astronomers have ascertained that the solar system had a ‘distinct preference’ for ‘commensurable mean motions’ between pairs of orbits (*Roy and Ovenden*, 1954).

¹¹ One can read 15 minutes of any Wooden book here: www.woodenbooks.com/ Martineau's *Little Book of Coincidence* features only three of the constructions here given.

Six years after his *Mysterium Cosmographicum*, Kepler discovered the elliptical motion of the planets, and then years later found his third law of planetary motions. Then in 1621 he republished his *Mysterium Cosmographicum*, making some allusions to his earlier work. He did not conclude, as modern readers believe he ought to, that his earlier work had been invalidated by his discovery of elliptical motion! Instead, he was interested in both: the mean planetary radii used for the ‘ideal’ circular orbits, as well as their ‘actual’ elliptical motions.

Golden Equations of Time

In addition, Martineau has been involved in promoting certain ‘golden equations’ discovered by the Heath brothers, Robin and Richard. (Heath 1999, Kollerstrom 2011) Thus the solar year is given within ten minutes by

$$\text{Year} = (18 + \Phi)(18 + 1/\Phi) \text{ days to } 99.998\%$$

Where phi Φ is the golden ratio. The eclipse year, as the Sun meets the lunar nodes, is given by

$$\text{Eclipse year} = (18 + 1/\Phi)^2 \text{ to } 99.997\%$$

Clearly, the difference between them is given by $18 + 1/\Phi$ days, or just under 19 days. The difference between them equals the *square root of the eclipse year in days*; and is in turn equal to the node period – the time for the plane of the lunar orbit to revolve against the ecliptic – in years, viz. 18.613 years. So, a day-for-year correspondence is here being expressed.

This may help us to appreciate how both the Metonic and Saros cycles are equal to nineteen years: nineteen solar years for the Metonic cycle and nineteen eclipse years for the Saros. Thus the periods of these two are in the ratio, $18 + \Phi$ to $18 + 1/\Phi$. These proportions are all exact at *one part in ten thousand*. The Metonic and Saros cycles are both ‘magical’ in that they have no right to exist, they are ‘mere’ coincidences at an extraordinarily high precision. We write their ‘golden’ equations as

$$\text{Saros} = 19(18 + 1/\Phi)^2 \text{ to } 99.99\%$$

$$\text{Metonic} = 19(18 + \Phi)(18 + 1/\Phi) \text{ days to } 99.998\%$$

I like these phi-in-the-sky equations. We here express these heavenly equations in a somewhat different and more algebraic manner than have the Heath brothers or Martineau. In terms of what they mean, the ‘meaning’ of the golden ratio is that of perfection. It is the ‘divine proportion’ and philosophers and artists have endeavoured to express what we mean by perfection in this sense. Golden equations tightly interlock Earth’s axial rotation period, its distance from the Sun, and the lunar node period. They

are earth-centric in that they use tropical not sidereal periods, i.e. *no* orbit periods against the stars are here involved¹².

Epilogue

The work of *Hartmut Warm* (2012) is very compatible with Martineau's discoveries, although the former tends to discern more complicated symmetries, with three-planet patterns rather than two. The Warm text is more Keplerian in that it uses planetary aphelia and perihelia, whereas Martineau has mainly used mean orbits.

The high-precision 'golden' concordances here described would seem to exclude notions of chance and chaos in the formation of our Solar System. They rather indicate that intelligence and beauty, harmony and proportion, are working at least in our local region of the solar system. Phi-in-the-sky patterns suggest the difficult concept of perfection, and are compatible with a Leibnizian philosophy of cosmic optimism.

Martineau likes to explain his findings in terms of a 'local anthropic principle' whereby the harmonies are there, because reflective, self-conscious intelligence exists here on Earth. Has this somehow caused the self-reflective 'golden ratio' (as A is to B, so A+B is to A) to be found in the heavens around us? Here one would predict that on solar systems without intelligent life, no such special harmonies would be present.

It is from an Earth-centered perspective that these special perspectives appear. We all appreciate the coincidence of the Sun and Moon appearing the same size in the sky, though very different in actual size. A few appreciate that both luminaries rotate at the same rate *as seen from Earth*, 27.3 days being the mean sunspot rotation-period as well as the Moon's orbit-period. We perceive Earth-centered harmonies: as the same side of the Moon always faces Earthwards, so likewise the same part of Venus faces Earthwards at each closest approach. In his later *Little Book of Coincidence* (p.26) Martineau discussed this phenomenon, resulting from the rotation-period of Venus on its axis, maybe after I had described it to him (*Kollerstrom*, 2013).¹³

Venus' axial rotation period of 243.01 Earth-days (Warm, p.144) is two-thirds of an Earth-year, to 99.8%. The transit-cycle of Venus comprises four solar transits over a period of 243.00 Earth-years (*Lewis*, 1998): that is two transits over the Venus north-node, which we have just experienced,

¹² The tropical lunar node period of 18.613 years is used, not the sidereal period of 18.599.

¹³ For comments on the rotation-periods of Mercury and Venus, see *Kollerstrom* 2012.

separated by eight-years, and then a century later two more over its South node. A startling day-for-year concordance here appears. Thus, Venus spins 365.23 times in its transit-cycle, while there are 365.24 days in a year here on Earth. This definitely does not appear in modern astronomy books! It has to be an expression of the world-harmony, of what Kepler called *Harmonices Mundi*, and uses the most recent, precise data.

There is quite a bit more that could be said about that deeply mysterious, only recently-discovered axial rotation rate of Venus. I merely introduce it by way of building a connection between Mr Warm's researches and those of Martineau. Venus-rotation is in the 'wrong' direction compared to all other planets. Hartmut Warm wrote, 'That the rotation of Venus is so closely linked with its own orbit as well as with that of Earth ... is utterly mysterious.' (Ibid, p.151)

Modern astronomers peer at distant galaxies, but know that they have lost track of human meaning. We are here concerned with what is seen and experienced within our local region of space; and have argued that, using modern observations to four or even five-figure accuracy, we are in some way re-gaining a Pythagorean/Platonic view. Twenty-five centuries ago, Greeks took the word *Kosmos* which meant beauty, as in 'cosmetic', and applied it to the universe. Heraclitus the ancient Greek philosopher wrote, in that century:

'For those who are awake the cosmos is one and common, but those who sleep turn away each into a private world. We should not speak and act like sleeping men.' (Gregory, 2001)

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Nicholas Kollerstrom
47, Warner road
London E17 7DY
nkastro3@gmail.com